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URINE ANALYSIS AS AN AID TO DIAGNOSIS

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For a number of reasons the examination of urine as a routine aid to diagnosis of disease in the domestic animals appears to have been neglected in the past. In all probability this has been due, in part, to the fact that there is not available a sufficient amount of evidence upon which the clinician can assess the relative value of his findings, whether positive or negative, in any given sample of urine.

Admittedly there are certain difficulties in the way of collecting unsoiled samples of urine from the domestic animals; but it is within the experience of those who have determined to obtain samples that these can be overcome. At any rate, in the case of the horse, ox and dog it nas usually been my experience that the owner or attendant is willing to co-operate in obtaining a sample when the necessity or desirability of doing so is explained to him or her. With a view to obtaining information which will enable the clinician to assess the significance of any abnormality in a sample of urine, an analysis of a series of specimens was carried out irrespective of whether or not any aid to diagnosis was to be expected.

Up to the present the number of samples from horses and cattle has been limited and it is not intended to refer to them in any detail. At the moment, however, a systematic series of samples from dairy cows is being examined.

The examination of samples of dogs' urine has now been carried out over a sufficient length of time and embraces a number of samples which justifies the formation of certain conclusions which have on every possible occasion been substantiated by *post-mortem* examination.

Perhaps the first point which merits emphasis is that an examination of a sample of urine is not a short cut to diagnosis but is a very valuable aid thereto, and in a large number of both medical and surgical cases is essential if a complete examination of the patient is desired.

The relative positions of urine examination and X-ray examination appear to be similar in that they should follow and not precede a thorough clinical examination. Both X-ray examination and urine analysis are valueless without a knowledge of the clinical aspect of the case.

The first point which has been established beyond all shadow of doubt is one that is not new to clinicians, namely, that disease of the kidney in dogs is a very common condition and an appreciation of its presence is of the utmost importance.

The clinical picture presented by chronic interstitial nephritis is frequently so characteristic that its description here is warranted. It is generally in dogs past middle age that one expects the disease, though one case examined was only two-and-a-half years old.

The history commonly is one of irregular vomiting over a period, or possibly only a statement that the dog has had an apparently impaired digestive system with a capricious appetite: the bowel action, if known, is described as irregular. Usually poor bodily condition is evident or the owner states that there has been a progressive loss of bodily condition. Enquiry generally elicits the information that the animal has shown an increasing thirst and polyuria. Examination of the animal reveals the teeth coated with tartar or a brown film, the breath unpleasant, the skin dirty and frequently scaly or scurfy. Characteristically, the pulse is full and strong—bounding—an important point in differential diagnosis, for it will be realised that except for the character of the pulse, the description might well be that of chronic dyspepsia or gastritis with which the condition is often confused, though in actual fact the kidney disease is the more common one.

At a later stage, when uræmia becomes evident, vomiting becomes more frequent, appetite is completely lost and finally no food at all is retained and the vomit consists only of mucus. The pulse loses strength, but an outstanding feature is its strength in spite of the animal's obvious general weakness.

At any stage in such cases an examination of a sample of urine proves of the utmost value in confirming or refuting a tentative diagnosis of interstitial nephritis.

Experience has shown that the demonstration of albumen in the urine, along with the foregoing history and clinical signs, justifies a definite diagnosis. The amount of albumen has been estimated in a large number of cases and it has been found that the amount of albumen is no criterion of the severity of the kidney lesion. The severity can only be estimated by a urea concentration test. If the case is encountered in the later stages a fatal termination can be anticipated in a relatively short time, and on

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post-mortem examination the kidneys will be found to be pale and contracted, frequently to as little as two-thirds their normal size; the capsule does not strip freely, retention cysts are frequent. Microscopically the picture is that described as chronic interstitial nephritis. In spite of the fact that vomiting may have continued for some time and has been persistent and acute at the termination of the disease, the absence of any evidence of inflammatory change in the stomach is surprising and, at the most, only a slight degree of terminal gastritis is seen. If the disease is diagnosed in its early stages life may be prolonged and the vomiting controlled by adopting a diet with as far as possible a low protein content so that the demands on the kidney to concentrate urea are reduced to a minimum, it being well known that a kidney in such a state is unable to do so efficiently. But it is seldom that a case showing definite clinical signs survives many months.

Such an animal, should it become ill of some other disease, will in all probability die even though the disease is not one in which a fatal termination would normally be expected. Thus, a greyhound—a known subject of interstitial nephritis—was injured in the lumbar region, the injury involved some damage to muscle, but would not normally have been regarded as unduly serious. The effect, however, was that, the kidneys being unable efficiently to excrete by-products, a fatal toxæmia rapidly developed.

In another case an urgent surgical operation was performed under a general anæsthetic; four days later serious kidney symptoms developed which rapidly proved fatal.

In a third case a ten-year-old dog suffering from impetigo failed to respond to treatment and rapidly lost condition. Examination revealed signs of kidney disease, from which the dog succumbed.

While the value of demonstrating the ability of the kidney to concentrate urea is appreciated as a reliable index of renal efficiency, it has not so far been found practicable to carry out such tests efficiently in the ordinary routine of practice, and only a limited number of tests has been done. It is hoped that this will be possible later.

The following are cases taken at random from the Records of the Clinical Department of the Royal (Dick) Veterinary College:—

December 29th, 1931.

Fox Terrier Dog: Nine Years Old

The owner described the dog as having a "weak digestion," but lately vomiting had become more frequent. For the last five days vomiting had been persistent; the bowels were moving. The mouth was fœtid; the pulse full and strong; the mucous membranes were injected.

Urine.—Clear amber; Sp.G. 1018; Reaction, acid.
Albumen +. Esbach 0·05 per cent.
Bile Salts and Pigments —.
Blood, Sugar and Acetone —.

Diagnosis.—Chronic interstitial nephritis.
Treatment inadvisable; dog destroyed.
Post-mortem confirmed diagnosis.

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March 8th, 1932.

Scotch Terrier Dog: Nine Years Old

There had been a progressive loss of condition for some months, the dog now being emaciated. Chronic scaly skin lesions were present; these had resisted various forms of treatment. The animal had vomited irregularly for the past five months. There was considerable thirst and polyuria; the mouth was fœtid. The pulse was full. A muco-purulent discharge from the conjunctiva was present.

Urine.—Pale amber; Sp.G. 1015; Reaction, acid.
Albumen +. Esbach 0·10 per cent.
Bile Salts and Pigments —.
Blood, Sugar and Acetone —.

Diagnosis.—Chronic interstitial nephritis.
Treatment inadvisable; dog destroyed.
Post-mortem confirmed diagnosis, contraction of kidneys being very marked.

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September 6th, 1932.

Fox Terrier Dog: Six Years Old

The dog had been vomiting irregularly for about a year; but this became persistent a fortnight ago. There is excessive thirst. The dog is emaciated; its breath is unpleasant. The conjunctiva is injected and there is considerable muco-purulent discharge. The pulse is full and bounding. A tentative diagnosis of sclerotic kidney was given, but urine was obtained for confirmatory reasons.

Urine.—Very clear and pale; Sp.G. 1016; Reaction, acid.
Albumen +. Amount not estimated.
Bile Salts and Pigments —.
Blood, Sugar and Acetone —.

Diagnosis.—Chronic interstitial nephritis.
Dog died three days later.
Post-mortem confirmed diagnosis.

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January 26th, 1932.

Sealyham Dog: Five Years Old

The history given by the owner was one of irregular vomiting at long intervals for some time; with a varied appetite. The dog is in fairly good condition. The bowels respond to laxatives. The skin is scaly and the coat dry and harsh, there is a slight discharge from the conjunctiva; the pulse is very well filled. Possibility of nephritis considered.

Urine.—Clear amber; Sp.G. 1010; Reaction, acid.
Albumen +. Esbach 0·01 per cent.
Bile Pigments and Salts —.
Blood, Sugar and Acetone —.
Deposits of hyaline casts and amorphous urates.

Diagnosis. — Chronic interstitial nephritis — probably not advanced.

Treatment.—As far as possible a protein-free diet, combined with bismuth carbonate as a gastric sedative. Owner wished to treat dog. For the first three weeks the case made little progress, but later appeared to benefit from the treatment, and so long as protein was kept to as low a point as possible the dog showed no clinical signs, and appeared well in September. The period of survival is longer than other similar cases; one, after relative freedom from clinical signs for six months, became seriously ill and was destroyed.

June 7th, 1932.

Border Terrier Dog: Five Years Old

For some time the dog has not been in good health, and has an irregular appetite; thirst has gradually been becoming more marked. There is a tendency for the dog to be constipated. He has been irregularly sick. The temperature is normal, the pulse fairly strong, the mouth fœtid and the teeth are in a bad state.

Possibility of nephritis considered.

Urine.—Cloudy amber; Sp.G. 1027; Reaction, acid. Albumen —, and no abnormality found.

Diagnosis.—Alimentary toxæmia with oral sepsis. Responded to treatment.

The demonstration of albumen is not in itself diagnostic of interstitial nephritis, nor does it necessarily implicate the kidney.

The presence of albumen in the urine has been demonstrated in young animals convalescent from a febrile disease such as distemper, and in the course of a varying period this disappeared. It is a matter for conjecture whether these in later life become cases of chronic interstitial nephritis. It was noted in these cases that there were no clinical signs which would suggest that there was any inflammatory condition of the kidney. Albumen has also been demonstrated in acute disease of the respiratory tract, such as pneumonia and pleurisy with effusion. In inflammatory conditions of the urinary tract, such as pyelitis and cystitis, albumen has been constantly demonstrated. In these cases a microscopic examination of the deposit showed the presence of pus cells, epithelial casts and in one case numerous bacilli, later proved to be a pure culture of *B. coli*, the case being one of cystitis.

An interesting but unique case in the series in which albumen was present was one where an examination of the deposits revealed an oxaluria.

With three exceptions which were alkaline, the urine was in all cases found to be acid in reaction. The three exceptions were all diagnosed as cystitis and coincident with a return of the urine, under the influence of acid sodium phosphate, to acidity there was a marked improvement in the condition followed later by an apparently complete recovery.

Blood was demonstrated in cases of acute nephritis, pyelitis and cystitis.

In addition, in two cases of pleurisy with marked effusion, albumen and hæmoglobin were found in the urine.

In no case was sugar found in the urine; two samples sent in were stated to contain sugar but were found to be only giving a spurious reduction of Fehling's Solution, in one case due to glycosuronic acid and in the other to albumen.

In a paper entitled "Nephritis in the Dog," by R. H. Spalding, read before the New York State Veterinary Medical Society, the statement is made that sugar may occasionally appear during convalescence. It is difficult to understand such a statement.

Bile pigment has been demonstrated quite frequently in the urine of cases of dyspepsia with vomiting, intestinal catarrh and intestinal stasis. The presence of bile salts has been infrequent and has been noted principally in cases of disease of the liver, in some of which the presence of bile salts and pigments in the urine was expected.

Examination for indican has been carried out, but the demonstration of its presence does not appear to supply information which cannot be got by clinical examination. The following cases show the diagnostic value of urine examination.

July 7th, 1931.

Dandie Dinmont Dog: Three Years Old

The owner complains that the dog is stiff and cannot get upstairs. When walking the animal is constantly dribbling urine. He stands with his back arched and resents palpation of abdomen. The temperature is normal and the pulse good and regular. The owner gave castor oil, which was effective.

Urine.—Cloudy; Sp.G. 1020; Reaction, alkaline. Albumen +. Hæmoglobin +.

Deposits. — Epithelial debris, transitional epithelium, pus cells and bacilli, found by Bacteriological Department to be a pure culture of *B. coli.*

Diagnosis.—Cystitis.

Treatment.—Acid sodium phosphate and hexamine; liberal quantity of fluids.

Improvement manifest coincident with return of urine to acidity.

Dog discharged; no return of condition reported.

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March 9th, 1932.

Collie Bitch: Four Years Old.

The owner gave a history of irregular vomiting and stated that the dog was passing dark-red urine. The temperature was 103° F., pulse fast. Palpation showed pain in the lumbar region.

Urine.—Dark red; Sp.G. 1037; Reaction, acid. Albumen +. Blood +.

Deposits.—Red Blood Cells, White Blood Cells, Tubular Epithelial Casts, Blood Casts.

Diagnosis.—Acute nephritis.

Died four days later.

Post-mortem confirmed diagnosis.

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May 24th, 1932.

Sable Collie Dog: Seven Years Old

The owner said the bowels had not moved since May 20th, 1932, and that the dog had eaten nothing for past five days, but had been very thirsty. The mucous membranes were very icteric, pulse was full and bounding, temperature 102° F.

Urine.—Deep orange colour, with strong smell; Sp.G. 1028; Reaction, acid.

Albumen —. Bile Pigments ++.

Bile Salts —. Hæmoglobin +.

Deposits.—No abnormality.

Diagnosis.—Jaundice of hæmatogenous origin, but exact nature very uncertain.

Treatment. — Mercurial purges, copious subcutaneous injections of normal saline for

fourteen days, and limited carbohydrate diet. After seven days given diet of liver.
Made satisfactory recovery and discharged on June 20th, 1932.

The Tests Employed are as Follows:—

Albumen.—Heat plus acetic acid.
Cold nitric acid.
Doubtful cases confirmed by Tanret's Test.
Quantitive estimation by Esbach's Method.

Blood.—Hæmoglobin by the Guaiacum Test.
Blood by microscopic examination of the deposits, for blood cells.

Pus.—Microscopic examination of deposits.

Bile.—Pigments by nitric acid.
Salts by Hay's Sulphur Test.

Sugar. — Fehling's Test; Nylander's Test; Benedict's Test. Fermentation Test.

Urea Estimation.—Doremus Ureometer with alkaline hypobromite solution.

Acetone.—Rothera's Test.

Deposits.—Obtained by centrifuging 25 c.c. at 2500 revolutions per minute. Films prepared, stained methylene blue and examined with 1/12th objective.

Indican.—Chloroform Test.

A CLINICAL COMMENTARY*

W. H. WORTLEY, M.R.C.V.S.
Bungay, Suffolk

These notes have been somewhat hurriedly and, I fear, roughly compiled at the request of our worthy Secretary in the hope that the ensuing discussion may prove of some benefit to us all. It is perhaps human nature which prompts us to display our successes and conceal our failures: I mention this because most of the cases I am about to recite have been successful.

Open Joint.—My excuse for bringing forward these cases of open joint is that I had been taught to regard this trouble as virtually hopeless. On a Sunday afternoon in September, 1928, I received an urgent call from a local dairyman whose pony had been badly kicked on the near hind fetlock. I arrived within 20 minutes of the accident, finding the pony on three legs and the lame leg very muddy and with a contused wound of the antero-internal aspect of the fetlock joint, whence blood and synovia were flowing. The wound and surrounding parts were cleansed with a warm solution of lysol. On examining the wound more closely by separating the lips, I could plainly see the shining articular surface of the metatarsus. I further discovered that a piece of this bone had been split. The prognosis was very grave and the best we could hope for was a stiff joint. The owner was anxious to save the pony if he could, not because the animal was very valuable, being 14 years old, but on account of its perfect trustworthiness on the milk round. The wound was filled with iodoform and boracic paste, pad and bandage were applied and anti-tetanus serum given. The same dressing was applied on the Monday, and I was pleasantly surprised to find a little weight being put on the leg. On the Tuesday there was again a slight improvement. The wound was then dressed at intervals of two or three days and it was not until the tenth day that I removed the splinter of bone which I found was not re-uniting and had not become sufficiently detached to remove at an earlier stage. After this, the wound closed up and healed uneventfully—no permanent lameness resulting. The animal was under treatment exactly 24 days and resumed duty within 30 days of the accident. It is working to-day and the joint has given no trouble since.

The next case of open joint occurred in a radical operation for poll-evil. The subject was a Suffolk gelding seven years old. After about 11 inches of ligament had been removed and I was in the process of trimming up small ragged pieces in the region of the occipito-atlantoid joint, I was horrified to observe about half-an-inch of the shining articular surface of the occiput. My colleague, Taylor, who was helping with the operation, was less alarmed and mentioned a similar accident with subsequent recovery in Dublin.

The wound was dressed with iodoform and boracic powder and the horse was fed off the floor. The synovial discharge gradually abated and ceased after a week. No stiffness of the head followed. He made a perfect recovery and has been at work ever since.

Urethral Calculus.—The subject of my first case was a small Chinese mule and the incident occurred in 1917. This animal was noticed to be continually dribbling urine and there was a hard swelling in the perineum. An operation was decided upon. Casting hobbles were improvised from heel shackles, and cocaine was used as a local anæsthetic. I had the co-operation of Captain T. L. Wright in this case. A mesial incision was made and this calculus (showing specimen) weighing over 8½ ounces, was removed. I think it is a prizewinner. After treatment consisted of antiseptic lotions to the wound. Whether or not this was a cystic calculus to commence with, I cannot say.

I was called to attend a prime fat steer which was off its feed, uneasy, paddling the hind legs and swishing its tail. The hair at the end of the sheath was dry and a rectal examination revealed the bladder to be distended. The owner, who thought it was a stoppage, had given the

* Presented to the Eastern Counties Division, N.V.M.A., at Bury St. Edmunds, October 7th, 1932.

animal a large dose of turpentine and linseed oil. This put emergency slaughter out of the question. I decided to operate standing and made a mesial incision three inches long in the perineum. I cannot say I found the urethra easily, but once I had done so, blood-stained urine commenced to flow away. The wound was dressed with eupad and the thighs were greased with vaseline. Relief was almost immediate and the animal commenced to feed. No sutures were applied and although some infiltration occurred in the region of the wound, it closed to the diameter of three-eighths of an inch. The animal was sold to the butcher a month later as prime beef and the penis was sent me for inspection. I found the urethra crammed full of concretions for about three inches at the first curve.

My canine patients with urethral calculi have been fox terriers. The calculi have been lodged just behind the os penis. There is usually no difficulty in locating the trouble—the dog is uneasy, straining to pass urine. Abdominal palpation reveals a distended bladder, and if a metal catheter or probe is passed, the concretions are soon discovered.

The operation for their removal consists of a mesial incision over the site of the calculus. I have not been troubled by infiltration of the wound with urine, nor do I pass a sound once the channel is clear. Hexamine and bicarbonate of soda are given internally.

Regarding the cat, I cannot claim unqualified success. My procedure is to attempt to expel the obstructing calculi by pressure on the bladder. If this does not succeed, I endeavour to clear the urethral channel by passing a small catheter or probe. It appears better, for both cat and operator, to use an anæsthetic.

Calcium Treatment in Milk Fever.—Once in a way we come across cases of milk fever in which inflation seems to effect little or no benefit, the cow remaining comatose for two or three days, and when calcium therapy was first brought to notice, I thought we had found a good way out of our troubles. My interest in this was aroused when I read an article by Hancock in the *Veterinary Journal* in 1930. His recoveries appeared amazing. I have used calcium chloride intravenously in doses up to 400 c.c. of a 10 per cent. solution. One case in my experience which impressed me was as follows: A shorthorn cow which calved in August and had been dry since the previous March went down with milk fever at mid-day. The owner was away and I was not summoned until his return at 10.30 p.m. On arrival I found the cow completely comatose and I inflated the udder—and here I might mention that I have never treated milk fever by calcium alone, but have always inflated as well, and failing beneficial results with the patient, have then resorted to calcium. The cow was propped up and I saw her again some 12 hours later and was disappointed to find her as comatose as the night before. I inflated the udder again, but returned later in the day and gave her 300 c.c. of calcium chloride intravenously. After this she brightened up a little and drank a pail of water, but later relapsed. The following day I found her as comatose as she was 36 hours before. I gave her 400 c.c. intravenously, but did not re-inflate the udder. Having a call further on, I returned by the same road within an hour and looked in. She was standing up quite steadily on her legs, eating hay from the manger, and gave no trouble afterwards. I do not think it good for an udder to be inflated for more than 48 hours. In those cases of milk fever in which the cow, at first visit, is found to be very restless, inflation is not easily carried out and, when accomplished, the udder is likely soon to become deflated. You all have met the cow which stiffens her hind legs when we prop her up. In some of these cases I find small doses of calcium chloride have a useful quietening effect.

Perhaps it might be as well to mention that calcium chloride should not be given hypodermically as it will cause an extensive and persistent œdema. On the other hand, dextro-calcium may be given subcutaneously. Its effects, however, do not appear so rapidly as those of calcium chloride. We have used dextro-calcium both intravenously and hypodermically and it seems that fewer relapses have occurred when dextro-calcium has been given at the first visit.

Discussion

Captain W. Waters, in opening the discussion, said: I should like, first of all, to thank our Hon. Secretary for honouring me with the task of opening this discussion to-day, and, secondly, to congratulate the essayist on his very interesting and practical paper. In some ways, I wish that his cases had not been so successful, in which event it would have been easier for me to criticise his treatment.

Open Joint.—The case of the pony's fetlock injury is very interesting, and in spite of the excellent dressing applied, *viz.*, iodoform paste, I think it will be many years before he gets a similar case to heal so quickly and well. With reference to the poll evil case, I am rather sceptical as to whether the occipito-atlantoid joint was opened at all and should have thought the synovia probably came from the bursa protecting that region. I will admit that my knowledge of anatomy is getting somewhat rusty, but should not have expected this joint to have been opened so easily, and although I have done a good many similar operations in the past, have never had a similar misfortune or even suspected the danger.

Urethral Calculi.—All the cases described are of very great interest, but as I have fortunately, or unfortunately, never had similar ones to attend, I have no criticism to offer. I feel, however, that, when the occasion does arise, I shall have more confidence to operate than I should

have done before listening to this paper. Nevertheless, I should like to ask Mr. Wortley whether a bull which was made the subject of an operation for this condition would be likely to be of any further use for service.

Calcium Treatment in Milk Fever.—I must admit right away that I have no experience of this method, other than the occasional use of dextro-calcium, the reason being that I have never had it proved to my satisfaction that lack of calcium in a cow's blood is the cause of milk fever. Three or four years ago the scientists told us that milk fever was caused by lack of sugar in the blood and are said to have proved their contention by getting miraculous recoveries by intravenous injection of sterilised glucose only. Now we are told that it is due solely to lack of calcium, and I often wonder why, as inflation of udder has proved so remarkably successful, somebody has not stated that milk fever is due to the cow being short of wind, air, or oxygen.

I do not know whether Mr. Wortley is one who does believe that the disease is solely due to lack of calcium content, and, if so, whether he can explain the following:—(1) why are not heifers with first calf affected? Take, for instance, the Jersey which is encouraged to have her first calf soon after the age of two years, when not fully developed herself, and yet in spite of the fact that she may give up to 4 gals. of rich milk daily, there is little or no fear of the disease. Nevertheless, the same Jersey, calving her third calf when fully developed and especially if fed on luxuriant green food and calving in May or June, is a very likely subject; (2) if the disease is due to lack of calcium, why do not we get more disease in winter when animals are fed on artificial food than in spring and early summer when natural food, full of vitamins, is in abundance? and (3) if lack of calcium is the cause, can it be prevented for certain by feeding calcium round about the period of parturition?

Personally, when I am consulted as to prevention, I never mention calcium, but suggest that the animal should be kept off grass, semi-starved and purged frequently with Epsom salts two or three days before and directly after calving. This treatment is old fashioned, but reasonably reliable, and yet I think contra-indicated if the present theory is well founded. I have met similar cases to the one mentioned that would not respond for a considerable time; in fact, I had one three or four months ago. Here I first inflated the udder and she was no better when I saw her again seven hours afterwards. I re-inflated and gave a dose of dextro-calcium. On my third visit she was a little better, so I inflated for the third time, after which she got up and was given a strong purgative, only to relapse again a few hours afterwards. I then inflated for the fourth time, after which she gave no further trouble and made an uneventful recovery. Thus, with the exception of one dose of dextro-calcium, which appeared to have no effect, I relied solely on inflation.

The essayist suggests that fewer relapses occur if dextro-calcium is used as well as inflation in the first instance. I have in my practice one cow which always has milk fever twice after each parturition; last year, therefore, I gave her dextro-calcium as well as inflation at the first visit, only to find she had her second attack next day. I am interested to note that Mr. Wortley always applies inflation as well as calcium treatment and should like to ask him whether he has or has not the confidence to rely solely on the intravenous injection.

I think also that it would be interesting to hear a little of the technique of this operation, as having never done it in a cow, I should imagine it would be rather difficult at night in a dimly-lit cow byre, especially if the cow was in the excitement stage and with perhaps one man only to help you. I should like also to know what calcium chloride is and how it differs from calcium Sandoz, which seems to be the one most frequently used by calcium experts. Has he used the latter subcutaneously and, if so, what bad effects, if any, followed? I am afraid I have strayed from the scope of the paper a little in discussing the cause of milk fever, but feel that this was justified as an excuse for not changing my treatment for the more modern one. I should like to conclude by again congratulating the essayist on his paper, which I hope will create the discussion it deserves.

Captain P. R. Turner, who followed, commenced by enquiring if Mr. Wortley had any really useful anæsthetic for the cat? He had never really got a cat under an anæsthetic. (Laughter.) He would reiterate what Captain Waters had said: why had not the advocates of calcium injection sufficient confidence in it to exclude inflation of the udder? The speaker was very open-minded about the subject, and there were certain factors to support the calcium deficiency theory. On one or two occasions when he had been venturesome enough to adopt the intravenous injection of calcium Sandoz, he had had very gratifying results: where he compromised by inflating and injecting calcium-dextrose it was very difficult to know what put the cow right. He believed that they had a good treatment for milk fever in their hands until the time came when they could be absolutely certain that the disease was due to a calcium deficiency, and until a preparation was made which it was perfectly safe to inject. The speaker had had no experience of calcium chloride, and he would like to know who mixed it for Captain Waters and where he obtained it. He did not want to criticise his friend Captain Waters, at all, but the latter had argued that he had a Jersey heifer which did not get milk fever; she had two more calves, and at the third calving she contracted the disease. Captain Waters said that in winter time they were short of calcium and vitamins. Why?

Captain Waters: "That is what I want to know."

Captain Turner, continuing, asked, Why purge these cows? Why irritate their stomachs with magnesium sulphate? There was more gastritis caused by magnesium sulphate than they were aware.

Mr. R. Buchanan, of Stowmarket, recalled that the first time he used calcium he went to a cow down with milk fever, injected some calcium Sandoz, and the cow recovered. A day or two afterwards, he had another cow which was down, and he tried everything without success. What he was looking forward to was something which was going to cure the cow which was down and would not get up after milk fever. He had one case of open joint, in which, unfortunately, the horse died shortly afterwards. The leg was injured right on the tibia with a kick, and there was apparently no break in the joint. He tried the old-fashioned cold-water remedy. Later, it was ascertained that the tibia was smashed.

Mr. C. Nesling, of Framlingham, declared that in the first four cases of milk fever that he had experienced, he gave them nothing at all and they all got well. That was in 1899.

Mr. W. H. Dennett, of Fakenham, said that he had had reasonably successful results in many cases of open joint, using in the majority of cases cold water and bitter aloes. With milk fever, he was one of those who was perfectly satisfied with the pump. He had no cause to use calcium in ninety-nine cases out of a hundred. When he did use it, it had been in addition to the pump, and whether results had been due to the calcium or the pump, he could not say. As to the anæsthetisation of the cat, he thought that the use of chloroform alone was hopeless. His experience with cats was that they lost the majority of them. A.C.E. mixture might be satisfactory, but chloroform he found very dangerous.

Major T. G. Heatley, of Woodbridge, mentioned cases of open joint caused by kicks in the neighbourhood of the stifle, shoulder and elbow. He had had extremely good results by frequent injections of biniodide of mercury in solution every two hours, without any other treatment, and by keeping the animals as still as possible. With regard to urethral calculus, the best case he had was years ago in a Suffolk foal, in which there was complete stoppage of water. He found an obstruction about three inches from the end of the penis, and the urethra was very distended on the bladder side of the obstruction. He cut down on to this with a Symes knife. When the point of the knife went into the urethra, he discovered that the whole of the penis was charged with urine. He made the opening bigger, punctured the swollen penis, and treated it antiseptically. The animal went on quite well. When the horse was three years old, he was practically sold to go to Russia, but the prospective purchaser objected to a big splint the horse had got. It was then decided to keep the horse for stud purposes, but it was found that, owing to the injury at the time he was a foal, he could not extend. It was a good thing, therefore, that he was not sent to Russia. He was castrated, and sold for 90 gns. to an Oxford brewery.

Dealing with milk fever in cows, Major Heatley said that scientists in the laboratory had proved fairly satisfactorily that it was due to a calcium deficiency. People were saying, why use calcium if they got the same result from inflation? They had proved that inflation of the udder raised the calcium content of the blood. The speaker had been through all the stages of the treatment of milk fever since Schmidt. The majority of cases probably went on satisfactorily after inflation. Often they got cases which did not make progress, and then he used an intravenous injection of calcium gluconate.

Captain E. Brayley Reynolds, of Newmarket, observed that the great bugbear in the treatment of open joint was where the case had been neglected, and acute infection of the joint had occurred. It was quite a common thing for yearlings, when they were being broken, to fall down and get cut on the front of their fetlocks, a piece of skin being cut out and the injury extending right through the extensor tendon and laying open the fetlock joint, from which the synovia ran. In each case in his experience, these injuries had been thoroughly washed and the horses had made an uninterrupted recovery. The extra time one spent in endeavouring thoroughly to clean the wound to start with was well worth while. Major Heatley had referred to other cases of open joint as one generally understood them—the more serious cases. The speaker's opinion was that the majority were not cases of open joint, though he used to think they were. During the War, it was one of the commonest wounds of horses coming into hospital—horses with swollen legs and a small wound in the region of the stifle. The treatment they used to adopt was to split the skin right down for five or six inches, and what in the majority of cases one had been thinking was synovia running out was simply serum, with cellulitis and œdema of the skin. In these cases, the bigger they made the wound, the quicker the case healed. They generally yielded in about a week. He thought it quite likely that Captain Waters would agree that, in the operations they had to perform during the War for quittor, in removing the cartilage one did not mind much whether one opened the pedal joint. It was very rarely that one of these cases went wrong from that accident. He was a little surprised that the open joint in the poll evil case did so well as they had heard it did. With the big wound one made in poll evil, there must be very serious contamination or infection. It was really when open joint became badly infected that there was trouble with which to deal. As to the case of urethral calculus quoted by Captain Wortley, the speaker asked if the big calculus exhibited was showing in the perineum?

Captain Wortley replied that he could feel it.

Professor Reynolds commented that the degree of dilation one could get in the neck of the bladder and of the urethra up to the arch was really extraordinary. The instruction one read in surgical books on how to incise the neck of the bladder to make it bigger seemed ridiculous, because he thought that if one persevered with dilation, it was quite successful. The cases he had operated on at the arch, he had generally left open, and they always healed quite easily and well. One most important remark was made by Major Heatley and that was as to opening on to the calculus in the urethra with a Symes knife. It was a great risk. Concerning calcium injection for milk fever, he was feeling somewhat like Captain Waters—he was rather surprised at what appeared to be the necessity of using calcium, and yet Major Heatley was just in rebuking Captain Waters and the speaker for thinking such things. Major Heatley had said that people in the laboratories had given proof of their contention concerning calcium deficiency, and it was only right to follow their lead, for it might be that they would get something very much better even than they already possessed. Although one did occasionally get cases which were rather awkward to deal with, reinflation always seemed to do what was necessary. His opinion was that there was nothing like oxygen. The cows seemed to recover before the pathological changes took place, and therefore they got some relapses.

Major Heatley urged that it was the internal pressure which raised the calcium content. Therefore, it did not much matter whether they used air or oxygen.

Captain Turner intimated that he had used both air and oxygen. His idea was that it was purely a matter of pressure of air or oxygen on the milk-secreting cells, the milk drawing away the calcium from the blood stream. It was simply that pressure which stopped the cells from secreting, and then they got a return of the calcium balance.

Major Heatley suggested preventive measures in the case of valuable cows, which perhaps for some years had gone down with milk fever after calving. He suggested that after calving they should be given an intravenous injection as a

preventive. He instanced six cows, and said that five of them had not gone down with milk fever again. One did, but she did not prove such a prolonged case as previously. They could give a dose of calcium gluconate a few hours after calving.

Captain Reynolds produced some interesting specimens associated with cases of urethral calculus.

Colonel A. F. Castle, of Ipswich, explained that he used a piece of bandage to tie the teats of a cow, leaving them tied for at least two hours. He could not understand, proceeded the speaker, anyone being unable to distinguish between serum and synovia. As to the treatment of open joint, in many cases one got quite good results by simply injecting the wound with any reliable disinfectant. They very often used calcium in bolus and they found they obtained equally good results by giving it to the cow by the mouth as when given intravenously. As to the anæsthetisation of cats, in a general way if A.C.E. was not sufficient and effective, an addition of chloroform would have the desired result.

Replying to the discussion, Captain Wortley said that in the case of urethral calculus, the surgeon merely opened the urethra and the perineum in order to relieve the animal's immediate requirements—to pass water—apart from making another outlet for the urine of the animal he had mentioned so that it could be fattened. The speaker did not think that he would attempt to do anything further. In reply to the query as to why heifers with their first calves did not have milk fever, Captain Wortley pointed out that their reserves of calcium had not been drawn upon. Green food seemed to encourage more bulk secretion of milk. In every case of milk fever, the speaker told the herdsman to keep the cow on hay for three days, and then gradually to improve the diet. Some farmers had been told that if they limed their pastures they would not get so much milk fever. He did not consider that calcium treatment was altogether reliable and thought that they had got to find out a lot more about it before they could safely adopt it alone. In his view, one was bound to inflate; otherwise one would probably be criticised.

Explaining his method of injecting, Captain Wortley said that, having raised the vein and located the site, he shaved off about half an inch of hair and cleaned the site with spirit. He made a small hole in the skin with a small lancet. He was still to be convinced that there was no danger in air going into veins.

In reply to Captain Turner's query as to the preparation he used for the case of open joint, the speaker said that it was a roughly prepared solution. As to the anæsthetic for cats, he always used chloroform. He obtained his calcium chloride from the local chemists. Expressing appreciation of Major Heatley's suggestion about making a large opening in the urethra, Captain Wortley said that he thought it was small skin openings which favoured infiltration. As to the difference between serum and synovia, a clot of serum was a pale yellow, but a clot of synovia had something of a boiled-egg appearance. If one could explore the bladder at the time of the operation for calculus it would prevent a recurrence. Reverting to milk fever, a farmer, who claimed to be a knowledgeable man, told the speaker confidentially that if he saw a cow staggering, he gave it two quarts of lime water, and if there was no improvement in two hours, he gave it another two quarts.

The Veterinary Record

December 3rd, 1932.

URINE EXAMINATION

ELSEWHERE in this issue is published a paper entitled "Urine Analysis as an Aid to Diagnosis," by Professor G. F. Boddie, of the Royal (Dick) Veterinary College, Edinburgh.

That clinicians, particularly those engaged in canine practice, are fully alive to the necessity for exploring this very valuable aid to diagnosis, is evidenced by the discussion which took place on the subject at the recent Folkestone Congress.

As Professor Boddie points out, the incidence of disease of the urinary apparatus in the dog is so high that, despite the fact that symptoms would indicate the alimentary canal as the seat of the trouble, it is only upon examination of the urine that the true state of affairs is revealed.

The changes in the alimentary canal and nervous system constituting the so-called "uræmia," are usually recognised. The cause of the condition, however, is very imperfectly understood. That urea itself is not the cause has been definitely established, but what the exact nature of the toxic product in the blood is, has yet to be discovered.

Unfortunately we have no routine clinical method of accurately measuring blood pressure, and so we are unable to diagnose vascular hypertension. The question arises, how many of these cases are due to arterio-sclerotic changes as opposed to those which are a chronic inflammation?

Our medical confrères are fortunate in being able to obtain their patient's urine at specified periods of time, and are thus able, by applying provocative renal efficiency tests, to estimate fairly accurately the degree of inefficiency present. Such methods are hardly practicable in veterinary practice.

It has been pointed out that the quantity of albumen excreted in the urine gives no indication of the degree of the disease. The specific gravity, however, is often a valuable guide. The greater part of the solids excreted in the urine comprise urea and chlorides, and it will be found that in advanced cases of chronic contracted kidney, the specific gravity falls very low.

This fact is in marked contra-distinction to the case of glycosuria, in which although the

urine is copious and light in colour, the specific gravity is high, due to its sugar content. It might be mentioned that glycosuria is by no means rare in the dog, and both atrophic and malignant changes have been recognised in the pancreas.

That chronic disease of the kidney is one of the commonest causes of death in the dog is now fully appreciated. Its recognition in life by clinicians has reached a high degree of accuracy. The efforts of the pathologist, the clinician, and those engaged in experimental therapeutics, must now be directed to the study of its etiology and effective treatment, for of these latter matters we are almost in entire ignorance.

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

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NEW DIRECTOR OF ROSS INSTITUTE

Sir Aldo Castellani has been appointed director-in-chief of the Ross Institute for Tropical Diseases, in succession to the late Sir Ronald Ross.

He has been Director of Tropical Medicine at the institute for some years, and is a lecturer at the London School of Tropical Medicine. He was created an honorary K.C.M.G. in 1928 in recognition of his work on sleepy sickness in Uganda. He has held several oversea lectureships, and during the War served with the Italian Medical Service in the Balcanic zone. He was formerly director of the Government Clinique for Tropical Diseases at Colombo.

Clinical Communications

ACUTE BACTERIAL NECROSIS OF THE BOVINE LIVER

W. E. BLACKWELL, M.R.C.V.S.
Towcester

Subject.—Red shorthorn steer, three years old, in excellent condition.

History.—The animal, which was owner-bred, had always been perfectly healthy, and very quiet. Refused his cake on the morning of Thursday, October 27th, and stood about by himself during the day. When brought in at dusk, the steer walked somewhat stiffly, and grunted a little, as though in pain. I saw him at about 8 p.m.

Symptoms.—As I stood looking at him he appeared about normal: I could see nothing which was of the least assistance in helping me to arrive at a diagnosis. I made him walk. He was certainly slow, but otherwise I could detect nothing wrong. His muzzle was normal; he did not look distressed, and he seemed to take as much notice of us as did the other cattle in the yard. He declined each attempt we made to persuade him to partake of food. He staled: there was no abnormality about that. On taking his temperature, however, I was astounded to find it 107·6° F. The visible mucous membranes were neither dry nor injected, though the mouth was faintly fœtid.

Diagnosis.—I made what I thought was a very good guess—inflammation of the bowels resulting from plant poisoning—and next morning I produced evidence to support my theory; unfortunately, however, that theory was not entirely supported by the *post-mortem* evidence, though it was not wholly wrong.

Treatment. — Food was withheld. Linseed gruel, milk and salines were given, the animal was clothed and kept indoors. The bowels acted normally, though infrequently.

Course of Disease.—The temperature fell very slowly to 105·2° between Thursday night and Saturday night—48 hours. On Sunday morning it was still 105·2°. The animal had remained just about the same during this period. He could walk round the stackyard and there was nothing but the temperature to alarm me. He partook of a little hay and finished it normally. I thought such a high temperature over the whole of this period would render the carcass of little value from the butcher's point of view, but I was mistaken. It " set " just as well and as quickly as any other carcass, after the bullock was slaughtered on Sunday evening. At that time he was weaker and it was decided to have him slaughtered at once, which was done.

Post-mortem.—The liver was obviously the

seat of the trouble. It was roughly twice the normal size. Its surface presented a dirty yellow appearance, and seven or eight spots of a deeper yellow colour could be seen on it. These were more or less circumscribed and varied in size from that of a walnut to that of an ordinary watch face. On section, each seemed rather dry and tough, and there was a central cavity of pus surrounded by a fibrous capsule. In one or two of the affected areas the surrounding liver tissue was undergoing the destructive action of the invading bacilli. The other organs appeared perfectly normal and, as stated, the carcass had set as usual. A stretch of bowel about two feet in length was much inflamed both inside and out, and it was this fragment of evidence that saved from complete fallacy my theory as to the cause of the high temperature. There is a very good description of the picture here revealed on *post-mortem* enquiry in Wooldridge's Encyclopœdia, but it is only brief. The inflamed bowel was situated about mid-way.

Remarks.—Bacterial necrosis of the liver is rather prevalent this autumn in this part of the country: I daresay the wet summers of 1930 and 1931 have contributed largely to this result. I do not think I could diagnose another case during life if I saw one, though an exceedingly high temperature would certainly make me suspicious, in the absence of any other clue. I have recorded several cases of hyperpyrexia: in each one of those a temperature of 108° was reached. On those occasions my diagnosis was tolerably accurate, but in this case it was almost entirely wrong. The disease exists at this season mostly in subacute form as regards the liver, and is not discovered until after slaughter. The local butcher who dressed this carcass informs me that 50 per cent. of the young cattle he buys for his business have livers affected after this manner and that the lesions are more often present in heifers than in steers. Only this autumn has that condition obtained. I have made careful notes of cases recently met with in which the destructive effects upon various parts of the body tissues have been brought about by this bacillus.

Those of us who served on the Western Front during the war are not likely soon to forget the trouble we experienced in dealing with necrosis of the coronet in horses and mules, especially the former. The sloughing of the skin and subcutaneous tissues was more severe than could have been brought about by the actual cautery. One had simply to treat the symptoms until the skin sloughed before one could do anything to limit the destructive effect upon the invaded tissues. The wet mud on the Somme brought about the devitalising of the skin over the coronet, and thus gave the bacilli their chance, which they took with a vengeance.

Cattle ingest the bacilli while grazing. I think some preliminary inflammation of the bowels gave the germs such a fine start off in this case that their invasion of the liver, by way of the mesenteric circulation, was both rapid and in massed formation. It was this severely inflammatory stretch of bowel that gave some support to my theory of inflammation of the bowels by plant poisoning, as a primary cause of death in this instance: that, of course, may only be partially right or, indeed, wholly wrong, but I think it played some part as a causative factor.

Moussu states that bacterial necrosis of the liver is probably of uterine origin, and gives that as the explanation of its greater frequency in heifers. Personally I find it difficult to imagine this organism in any other than a destructive rôle. If I have another opportunity I shall certainly examine the uterus in a similar case, if the subject happens to be a heifer.

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TENDON RUPTURE IN A CAT

HAMILTON KIRK, M.R.C.V.S.

Some months ago a kitten, aged about four months, was brought in with the history that it had knocked down a large vase which, in falling, had evidently struck the cat. Upon examination it was found that the tendo-Achilles of one hind leg had been completely torn away from the head of the os calcis. The hock could be flexed to such an extreme as to permit the metatarsus to lie close alongside the tibia, and in progression, the cat walked on the entire length of the metatarsus from hock to toe.

It was pointed out that the task of suturing ruptured tendon to its bone insertion was extremely difficult, if indeed possible, and that in view of the small value of the animal, destruction was probably the best advice that could be given. The kitten was removed to the hospital for this purpose, but action was delayed.

Reference to several surgical works gave no useful information as to what might be done in such a case and I eventually decided to see what amount of natural healing—if any—would take place.

At the end of six weeks the kitten was walking on its toe, and after two-and-a-half months the tendon appeared to have grown completely down and attached itself again to the os calcis. To-day the animal walks and runs perfectly and nobody would know that the Achilles tendon had ever been ruptured. The results in this case seem to afford a useful piece of knowledge, and in future cases, I shall not so readily advise destruction. It should, however, be remembered that the patient was young and that healing in such a case would normally be more rapid and certain than in an old animal.

FOOD-CONSTITUENT DEFICIENCY IN DOGS

R. HUDSON, F.R.C.V.S.
Retford

I was recently called to attend four Labrador retrievers, the ages of which varied from one-and-a-half to eight years. Two were under two years and the others were six and eight years old.

They had been ailing for about two months but had become much worse during the last week.

They were feeding fairly well, but were losing condition and were dry and scurfy in their skin. All were weeping at the eyes, the watery discharge leaving a dark line as it fell to the lower jaw. The conjunctiva was injected and the arteries prominent on the eyeballs. The gums were red, the mucous membranes beneath the tongue and about the fauces swollen and congested. The saliva in the mouth was distinctly white in colour and two dogs were dribbling. There was no smell nor was there any sign of necrosis. The temperature ranged between 101·5° to 103° F. The pulse was weak but not markedly accelerated.

The two young dogs were lame and showed signs of rickets. All were dropped on their pads and their toes were spread out. One showed great thirst but no vomiting. There was no diarrhœa at first, the fæces being soft; later, in two dogs, they became very thin and blood-stained. There was an absence of cough and nasal discharge.

One young bitch died rather unexpectedly. The *post-mortem* examination showed some fresh blood about her lips but no signs of necrosis on tongue or gums, and her mouth had improved.

The abdominal cavity appeared normal and showed a fair amount of omental fat. The liver was normal, but dark in colour; the stomach was empty, the mucous membrane slimy and only slightly congested, but there was present a patch of veins which showed a vivid blue. The intestines, opened here and there, were normal except about a foot near the rectum, which was inflamed and contained bloody fæces. The kidneys and bladder appeared to be normal.

The heart showed a very firm blood clot and separated lymph which clung tightly to the valves. The lungs were collapsed in patches. Really, the only pathological feature found was the inflamed lower bowel.

The diet had for many months consisted of tallow-craft—a pressed cake made up of pieces of tissue after the fat had been extracted—and Indian meal: about seven pounds of meal being boiled and about one-and-a-half pounds of tallow-craft mixed with it. It was allowed to set, forming a soft mass and fed cold. Naturally, it was a badly balanced food for dogs.

The attendant attributed their illness to the flesh of ewes which died last spring at lambing time, for he said they would not eat the first food after it was finished and he was some time before he got them to their food again.

Treatment.—The dogs were put on a raw meat diet and some wholemeal and cooked meat. The old dog was hand-fed—being now refusing—with pieces of meat and he was improving but died soon after receiving two eggs beaten up in milk.

Drugs given were: soda salicylate gr. x; ammon. carb. gr. ii; mag. sulph. gr. xx; and later, as the mouth cleaned, calcium chloride gr. v twice daily in one tablespoonful of water. One dog seems lively and much improved. The other is improving but his eyes weep occasionally.

A terrier, fed on scraps from the house, runs about among the others, but is perfect in health, and other dogs have visited but picked up no infection.

WEIGHT OF RACEHORSES' HEARTS

"I see that in Germany the hearts of two prominent racehorses (Hannibal and Festino) have been weighed," writes "Hambletonian" in the *Meat Trades' Journal*. "*Sportwelt*, which announces the fact, does not state what was the object of the *post-mortem* or why the hearts are being exhibited in a Frankfort museum. It would be interesting to know what deductions have been formed. We are told that the weights of the hearts of the two animals mentioned was 5¼ lbs. each, whereas that of St. Simon's famous daughter, Festa, who did so well as a brood mare in Germany, weighed only 5 lbs. We often hear the remark—we have always taken it as merely metaphorical—that certain horses (both racers and hunters) 'have a great heart,' this connoting courage, gameness, and such freedom from temperamental moodiness that they always 'run generous,' and 'put it all in.' If the weight of a horse's heart has any influence upon these attributes then those exhibited at Frankfort pale before that of Eclipse. When that great unbeaten horse died on February 27th, 1789, at the age of 26, there was a *post-mortem* and Mr. Charles Vial de St. Bel, Professor of the Veterinary College of London, in his account of the autopsy (quoted by Whyte in the *History of the British Turf*, vol. 1, p. 527), said: 'It is worthy of notice that the heart weighed 14 lbs. The skull was not opened as it was my intention to preserve entire the skeleton of so famous a horse.'

"To this Whyte adds (p. 520), in speaking of the weight of Eclipse's heart 'to this extraordinary circumstance he was supposed to owe his great natural courage. At his interment ale and cake were given, as at that of the Godolphin Arabian.'"

* * * * *

A Reuter's cable from Naboomspruit, Transvaal, says hailstones were found lying 12 in. deep in the Springbok Flats near there after a terrific storm. The hailstones killed 400 cattle, 2,000 sheep, and 30 small deer.

Abstracts

[The Mode of Action of Calcium. Seekles, L., Sjollema, B., and van der Kaay, F. C. *Biochem. Zschr.* 1931/32. Vol 243, Nos. 4-6. Vol. 244, Nos. 1-6.]

This is a series of five papers dealing with the effects of administration of calcium salts, etc., on the metabolism of cattle, the work having special reference to milk fever, grass tetany, etc.

1. *The effect of intravenous injections of calcium on the heart of cattle with disordered mineral metabolism.*—A number of cows suffering from milk fever or grass tetany were used in these experiments. They were dosed with calcium chloride intravenously and their blood serum was examined both before and afterwards for Ca, inorganic P, and Mg; in addition, the action of the heart was studied by auscultation after treatment. Four types of cardiac response were encountered, one dangerous (great increase in pulse frequency—heart block—syncope) and three harmless (normal heart action not much altered). It appeared that there was a connection between the type of response and the blood mineral constituents, but the original work must be consulted for study, as the data are so extensive. The dangerous type of response could be prevented by using a mixture of $CaCl_2$ and $MgCl_2$ for the injection. The above holds good for milk fever, but in grass tetany there seems to be no connection between the response and blood mineral content. In grass tetany the body is extremely susceptible to external stimuli and the heart beat is readily influenced by such.

2. *Antagonistic heart action of calcium and magnesium in normal calves.*—Three lots of three to five days old calves were dosed intravenously with $CaCl_2$ (3-6 gm. crystals pro 30 kg. body weight in 10 per cent. water), $MgCl_2$ (1-2·25 gm. crystals pro ditto in 10 per cent. water) and a mixture of the above (same dosages) respectively. It was found that each salt separately had a similar effect, in the majority of animals an arythmia cordis occurring immediately after injection, whilst in the majority of calves dosed with the mixture no such cardiac disturbance occurred. A proportion of Ca-Mg of 4-1·5 disturbed the heart least. The authors suggest that the arythmia may be due to cramp of the coronary blood vessels of the heart and further that this should be preventable by a preliminary injection of a nitrogenous preparation.

3. *Antagonistic heart action of calcium and magnesium in cattle suffering from disordered mineral metabolism.*—Thirty cows suffering from milk fever were each given a mixture of $CaCl_2$ (40 gm. crystals) and $MgCl_2$ (15 gm. crystals) in 300 c.c. water with excellent results, which agree with the findings in the case of the calves (*vide supra*). No case of heart disorder was observed.

4. *Calcium-magnesium antagonism in magnesium narcosis, after experiments on young calves.*—It has previously been found that a condition of narcosis occurs when the fraction Ca/Mg is low (2 in milk fever). This action was studied by experiments on calves, which were given intravenous and subcutaneous injections of $MgSO_4$. In some cases the blood calcium content was previously lowered by injections of sodium oxalate. Three calves given magnesium salt, as described in part 2, showed no narcosis although the fraction of their Ca/Mg was reduced to an average of 1. Calves given magnesium salts after previous dosing with sodium oxalate were narcotised and more regularly when the Mg was given both intravenously and subcutaneously. This narcosis had great similarity to the comatose condition observed in milk fever, and recovery to consciousness was obtainable by giving calcium chloride intravenously. It was also found possible to narcotise calves by giving $MgSO_4$ alone subcutaneously in five parts at different parts of the body, the dose of each part being 12·5 gm crystals in 25 per cent. aqueous solution. The narcosis developed in 20 to 30 minutes and lasted for some hours and it was found that the average Ca/Mg fraction was 1·4. The symptoms of recovery following Ca administration in the calves were very similar to those of Ca-treated cases of milk fever and a relapse was observed in some cases.

5. *The autonomic equilibrium in the bovine body in connection with the composition of the blood serum in experimental and pathological hypocalcæmia. A contribution to the knowledge of the toxic action of oxalic and citric acid after intravenous injection.*—New-born calves, yearlings, a two-year-old heifer and an old pregnant cow were employed in testing the action of sodium oxalate and sodium citrate on their blood mineral content. Sodium oxalate in doses of from 3·8 to 60 mg. pro kg. of body weight caused a rapid fall in the blood calcium in all animals, with most marked symptoms in the older ones, the symptoms ranging from nil to dyspnœa, cramp and death. It was noticed, however, that the Ca blood value never fell beyond about 4 mg. per cent.: the authors suppose that this was because part of the blood calcium is not in a combination suitable for combination with the oxalic acid, part of which could also be demonstrated in a free form in the blood (for many hours). Reduced sensibility to external stimuli occurred in some cases, but did not regularly coincide with the period of lowest Ca content in their blood. Sodium citrate

was found to have no effect on the blood calcium. In two cows treated with oxalate a vagotony was observed and the same was found in one case of milk fever.

J. E.

* * * * *

[Regulation of the Acid-base Balance of the Blood. Reihart, O. F. *N. Am. Vet. 13.* 11. 47-50. 2 Figs.]

The importance of the maintenance of the acid-base balance of the living organism is recognised by the modern veterinarian, who will welcome this exposition of the manner in which this equilibrium is maintained by both chemical and physiological mechanisms, with particular regard to the effect of the influx into the system of abnormal quantities of acid or alkali. The danger of excess of alkali is slight, except under very unusual circumstances, whereas changes towards the acid side are by no means an infrequent contingency.

The acid and basic elements are balanced in such a way as to produce in the blood a definite H-ion concentration, one which is expressed by pH value of about 7·4, normal blood thus being very slightly alkaline. The mode of maintenance of this balance by (*a*) chemical buffer and (*b*) purely physiological mechanisms is outlined and illustrated with clarity. In so far as these mechanisms are able to cope with an acidotic tendency, the constancy of pH will be maintained. When, however, they cannot do so, whether this be due to depletion of the base to the point where it can no longer neutralise the acid present or to failure of the physiological functions, a significant acidosis will develop.

The opposite of this picture, an alkalotic tendency, is not so likely to manifest itself, but its occurrence and significance are discussed.

W. B.

* * * * *

[The Dublin Type of Salmonella as a Cause of Disease in Calves. Bosworth, T. J. and Lovell, R. (1931). *Second Report, Inst. Anim. Path., Univ. of Cambridge,* 21-27, 5 tables, 22 refs.]

Although it is known that certain members of the Salmonella group may give rise to disease in both man and animals, it is in relatively few cases that the exact antigenic structure of the strains isolated has been determined. This record deals with three outbreaks of disease in calves, two of which occurred amongst batches of calves purchased from a dealer by the Institute of Animal Pathology, Cambridge. These two epidemics were characterised by symptoms of abdominal pain, diarrhœa and in some cases pneumonia. In one outbreak eighteen of a herd of twenty died, whilst in the other eight of ten succumbed. The other outbreak was diagnosed from the examination of the lungs of a calf sent for examination because of an outbreak of contagious pneumonia which had occurred in the area of the veterinary practitioner who forwarded the specimen. In this outbreak, pulmonary symptoms were evident but no diarrhœa was observed in any of the affected animals. Of seventeen cases, three died.

In each outbreak the Dublin type of Salmonella was isolated and this organism, which may be described as a sub-type of *Bact. enteritidis*, has been shown to cause, in man, food poisoning, meningitis and cases of continued fever with septicæmia. Some of the strains isolated in Denmark from cases of calf dysentery have been shown by previous authors [Smith and Scott, 1930, *J. Hyg., 30,* 32] to be the Dublin type. Because of the association of cow's milk with some of the human cases, coupled with the fact that some of the Danish strains of *paracolon* bacilli were of this variety, Smith and Scott express the opinion that it may have a bovine origin. The paper by Bosworth and Lovell is believed to be the first record of its isolation from bovines in Great Britain.

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[Losses in Sheep following Inoculations against Anthrax. Brune, Renauldon and Guyon. *Revue Gén. de Méd. Vét.* October 15th, 1932. *tome XLI. pp.* 607-611.]

Although two inoculations (given intradermally) are recommended by laboratory experience, single inoculations have in recent years been found quite satisfactory in the Eure and Loire districts. Dauvois, in the Loiret, had inoculated over 20,000 sheep without mishap, the dose used being the second or larger one. This method was much preferred by breeders on account of its low cost and labour saving. During the spring of this year the following losses have been noted after single inoculations. (No complaints were received before that date.).

(*a*) *April 20th,* 1932.—Of 80 ewe lambs and one ram (two years) inoculated four died within six days, including the ram. The remainder of the flock were sick but recovered after serum dosage of 10 c.c. each.

(*b*) *May 20th,* 1932.—Of 109 lambs and nine rams inoculated 11 died at intervals up to the beginning of July. This loss included one ram. Doses of serum (20 c.c.) were not sufficient to arrest the mortality.

(*c*) *June 1st,* 1932.—Of 55 ewe lambs inoculated, four died at intervals up to eight days. None of the remainder showed symptoms of illness. All received serum treatment (10 c.c.). Pasteur Institute vaccine, freshly made and tested, had been used in all cases. *Post-mortem* appearances of anthrax were noted. The bacterial agent which was the direct cause of

death was vaccine (proved on laboratory examination), so that post-vaccinal infection was ruled out of the question. Rather cold weather conditions were experienced at the time of the inoculations and this, combined with the fact that the sheep had been recently shorn, would account for lowered vitality and poor resistance to the vaccine. The authors attach some importance to the fact that in recent years only young sheep have been inoculated; hence a lessened degree of immunity in lambs born of ewes not recently immunised. Double inoculation is recommended as the only safeguard against further accidents.

Since the above investigations the authors have received other reports of deaths following single inoculations (in Eure and Loire). In these cases evidence of anthrax was noted on *post-mortem*, but laboratory examinations were not carried out. In a flock of 150 which had been shorn a fortnight previously, one lamb died in four days and one ram in five days after inoculation. Out of 250 lambs and ewes, eight ewes died a few days after inoculation. Shearing had been carried out after inoculation. Of 50 lambs vaccinated May 31st, 1930, two died on June 4th; of 30 lambs vaccinated July 4th, 1932, two died up to July 10th; of 162 lambs vaccinated May 17th, 1932, two died on May 22nd. In the last case shearing had been carried out 15 days previously.

T. J. M.

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[**Fowl Pox in Hens.** Hagemeister. *D.T.W.* No. 36. September 3rd, 1932. 568.]

This article has reference to a flock of 1,500 hens which in the late summer of 1931 were vaccinated against fowl pox. The flock had had a clean bill of health for years, and surprise was occasioned when fowl pox occurred in the flock six weeks after prophylaxis. Twenty per cent. were affected, and 60 per cent. showed nasal catarrh, and the trouble continued until December, when it began to abate. Further enquiries revealed the fact that fowl pox was prevalent in the district and presumably the resistance conferred by the vaccine has been insufficient to protect against a virulent attack. A campaign of intensive treatment was started to control the disease. The affected were isolated and carefully treated, and sulphur liquid was given in the drinking water in 2 per cent. solution. The egg yield now rose in an astonishing manner and led the author to ascribe this result to the sulphur liquid. Poultry owners frequently and vainly spend money on medicaments for catarrh, and the author commends further study of sulphur liquid, not only in prophylaxis, but because it appears to exercise a favourable influence on egg production.

W. L. S.

[**Bacterial Flora of the Uterus of the Mare.** Miessner and Köser. *D.T.W.* No. 36. September 3rd, 1932. 561.]

The authors refer to the difficulty of this examination, arising from the risk of external contamination. The examination material consisted of uteri from non-pregnant slaughtered mares, as well as uterine secretions from living mares examined shortly after parturition, but for the purpose in view the former material is much to be preferred.

Of the non-pregnant mares negative cultural results were obtained in 53 cases out of 67 uteri examined. Fourteen showed growth of *B. coli* and cocci, associated with congestion and dampness of the uterine mucosa. In one case *S. equi* was isolated from an obviously diseased uterus.

For the removal of uterine secretions from mares shortly after parturition, Götze's special catheter was found useful, but cultural examination showed that about 80 per cent. of cases contained micro-organisms. This high percentage of infected uteri is probably due to the removal of material through the still-open os uteri, and the probability is that the non-pregnant uterus of the mare is free of micro-organisms, except for the first five or six days after parturition. During these five or six days the organism most frequently encountered was *B. coli*, with micrococci occupying second place. Hæmolytic streptococci were demonstrated in 7·2 per cent. of clinically healthy mares following normal parturition; but in a single case a hæmolytic streptococcus (*S. equi*) was obtained from a pathologically altered non-pregnant uterus. *Br. abortus equi* was detected in nearly 6 per cent. of the lochial secretions, and was referable to the existence of this disease in the stud. On the average this micro-organism was no longer detected in the uterus 18 days after the act of parturition or abortion.

W. L. S.

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[**Insulin in Diabetes Mellitus in Dogs.** Mayr. *D.T.W.* No. 36. September 3rd, 1932. 566.]

Details of three cases of canine diabetes are recorded. The first case proved to be one of pancreatic diabetes, and death occurred after 48 days' treatment. Ten to 40 units of insulin were subcutaneously injected each day, and apparently were without effect on the urine sugar and acetone. The author states it would be of interest to try the effect of larger doses in such cases. Case II concerned an eight-year-old sheep dog, treated in like manner, weighed daily and quantitatively examined for urine sugar and acetone. After 31 days these substances could no longer be detected. Case III was in a male terrier which showed a high content of albumen and urine sugar. It received 40 units insulin intravenously, but this did not allay the diabetic coma. On *post-mortem* there

was liver degeneration, anthracosis, swelling of the kidneys and gastro-enteritis, while the pancreas showed chronic interstitial thickening with degeneration of the gland parenchyma.

In cases I and II it was observed that a pure flesh diet was able to maintain the body weight for a long time. On the other hand, the body weight diminished on a diet of pure carbohydrate (potatoes). In case I, during the period of flesh feeding, acetone appeared in the urine, and this gradually disappeared on the carbohydrate diet, only to reappear on the resumption of the flesh diet. Insulin had no influence on the occurrence of urine acetone.

W. L. S.

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[**Parturient Laminitis in the Mare.** Camus, R. *Recueil de Médecine Vétérinaire.* Vol. 108. No. 9.]

The author of this paper, a review of which appears in the *Recueil*, after giving a definition of laminitis and a succinct history of the affection, goes on to describe the anatomy of the horse's foot, remarking on its vascular richness and its liability to develop congestive phenomena of all kinds. Reviewing then *post-partum* founder, he describes rest, plethora and heat as predisposing causes and infection of uterine origin as the determining cause. Founder of parturition is stated to be merely a form of puerperal infection. On account of this etiology prognosis should be reserved, as it depends on the violence of uterine infection. Treatment, to be efficacious, must be undertaken early and comprises bleeding, local uterine antisepsis and general internal antisepsis. As a result of many observations the author recommends as curative methods of choice antiseptic therapy and anti-virus therapy.

It is permissible to observe that in every case of parturient laminitis it is advisable to explore the womb for the detection of a piece of retained placenta—a not uncommon cause of the accident—and to remove it. Possibly the most vital indication for treatment of the condition has been left unmentioned in this essay, namely, the casting of the mare and keeping her in the recumbent position for ten or twelve hours and again casting her if, on rising, she refuses to lie for some hours.

To anyone who has watched a patient with an acute attack of the malady the advisability of this procedure must be obvious, and yet how seldom is it insisted on or even referred to? Williams' " Surgery " certainly contains these directions for such cases: " If a horse will not lie down of his own accord he ought to be cast; when very often the relief thus obtained will cause him to remain recumbent for many hours."

To get the happiest results there should be no waiting; as soon as the diagnosis is made the patient should be cast, thus preventing those alterations in the feet which, after recovery, may leave the subject valueless.

W. R. D.

Review

[**La Peste Bovine.** By G. Curasson, Inspector Général S.V.C. Published by Vigot Frères, 23, Rue de l'Ecole de Médecine, Paris. 1932. pp. 334.]

This book, which contains a short preface by Professor Vallée, is one that can be highly recommended to those requiring an intimate and up-to-date knowledge of cattle plague.

It is a very complete and exhaustive work on the disease, written by one who has a thorough grasp of his subject. The author has spent more than 20 years in French West Africa and Eastern European countries, being for the most part engaged in special investigation and research in this disease. This book, therefore, approaches the subject from a very practical standpoint, embodying the latest laboratory methods and field work as carried out in different countries. The bibliography at the end is comprehensive and contains references to most of the work carried out in investigation (during the past 30 years especially).

The history of cattle plague in different countries is given in some detail and makes interesting reading. It would seem to have been in existence for several hundred years before the Christian era and still continues with unabated vigour over a large portion of the earth's surface.

Virgil (Georgics) described some such disease and advised isolation and slaughter as prophylactic measures. The spread of the disease, especially in Europe, has been closely associated with wars and movements of troops and supplies: this was readily exemplified in the Great War, when serious outbreaks occurred on the Eastern Front (Ukraine, Bulgaria and Rumania). The disease seems to have been always endemic in the East and has caused from time to time more or less serious outbreaks in Western Europe. When, in 1919-20, cattle plague had spread to such alarming proportions in Poland, the Polish Government availed themselves of the services of the author and Professor Devanille, with the result that it was soon stamped out. At the present time, Europe, with the exception of Turkey, is free from cattle plague. The author makes reference to the outbreak in England in 1865. In this instance infection originated in cattle sent from Reval and in a few weeks England and Scotland were badly affected. The losses in this outbreak amounted to 500,000.

Diagnosis, from a practical point of view, is difficult, and on page 90 the author says: "Apart from experimental inoculation, the laboratory has not at its disposal up to the present time any sure method of diagnosis." Contrary to the opinions of many writers, the author has not found albumen in the urine in infected cases, nor has he noted redness of the urine as a constant symptom.

A large proportion of the book deals with the biological study of the disease and immunisation by serum and vaccine. In the various countries where the disease is rife, measures of prophylaxis differ greatly. As the virus is easily destroyed by exposure, live preparations do not keep for long, hence much laboratory work is done on the spot, often in a crude manner.

M. Curasson describes his method of vaccination, discovered by him in 1928. The vaccine consists of infected spleen pulp in 2 per cent. formalin solution, and it has the advantage of being easily prepared, while it conserves its strength for long periods (at laboratory temperature from 47-76 days). This method is now much used in Africa and Indo-China and has given excellent results.

M. Curasson's book should do much to coördinate and perfect our knowledge of cattle plague as seen in the different countries, for it is only by combined scientific effort aided by police sanitary measures that this plague may be finally wiped out.

CONTAGIOUS ABORTION RISKS

It is a well-known fact that contagious abortion is far more prevalent in herds which are replenished by cows purchased from outside than it is in home-bred herds. Recent confirmation of this truth is quoted in "Occasional Notes" from the Oxford Agricultural Economics Research Institute. A survey carried out by the Institute in 1932 of eighty dairy farms in sixteen counties shows that of the sixty-nine herds which relied either partly or entirely on outside purchases for their replacements no fewer than thirty-three were suffering, or had suffered recently, from contagious abortion. The other eleven herds were recruited entirely from home-bred stock and only one of them had contracted the disease.

"These figures represent a very small sample, but if they are at all significant it looks," says the *Scottish Farmer*, "as if a herd where cows are bought stands about an even chance of contracting the disease, whereas there may be something like a ten-to-one chance against contracting it if the herd is maintained with home-bred stock."

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Under a scheme organised by the National Milk Publicity Council over a million school children receive milk either free or on payment.

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More than 53,000 animals had, up to the issue of the last volume, been entered in the Dairy Shorthorn Association's Register for milk recorded non-pedigree Shorthorn type and their progeny by pedigree bulls.

N.V.M.A. Divisional Reports

EASTERN COUNTIES DIVISION*

MEETING AT BURY ST. EDMUNDS

The Autumn Meeting of the Society was held at Bury St. Edmunds on Friday, October 7th, 1932, with the President, G. T. Matthews, Esq., in the chair. There were also present: Messrs. J. Buchanan, V. Boyle, W. J. Browning, W. Blyth, W. H. Wortley, T. G. Heatley, E. Brayley Reynolds, W. Waters, W. H. Dennett, N. F. Pollock, C. C. Nesling, A. F. Castle, P. Welch, A. J. Beeson, B. A. Claxton, W. Loveless, D. Jack, R. Turner, R. P. Smith, and the Hon. Secretary (H. P. Standley, junr.).

The minutes of the last meeting, as published in the *Record*, were taken as read and signed.

Apologies for absence were received from Messrs. M. Bray. H. Buckingham, S. Gooch, Professor Buxton, Professor F. Hobday, Messrs. R. Glover, W. Howes, H. Loveless, J. Reid, W. Shipley, H. P. Standley, senr., F. Thurston, C. Townsend and H. W. Wilkinson.

Obituary. — The President mentioned the recent losses sustained by the Society in the deaths of Messrs. R. C. Tayler, of Colchester, and J. F. Smith, of Halesworth, and requested the members to signify their respect and sympathy in the usual way. The Secretary was asked to send letters of condolence to the relatives, on behalf of the Society.

Elections to Membership.—Messrs. Cochrane-Dyet (Colchester) and R. B. Smith (St. Ives) were elected members of the Society.

Next Meeting.—It was decided to hold the next meeting in Norwich during the month of February.

Paper.—Captain W. H. Wortley then read a paper on cases of interest with which he had met.

[Captain Wortley's Paper and a report of the ensuing discussion are reproduced under the heading "A Clinical Commentary" earlier in this issue.—Ed., *V.R.*]

At the conclusion of the discussion on the cases brought forward by Captain Wortley, both he and Captain Waters were accorded hearty thanks, on the proposition of the President, seconded by Major Heatley.

Further Cases of Interest

As time allowed, the President now enquired if any members had further clinical questions to ask or cases to relate: an enquiry which met with a good response.

Mr. Buchanan mentioned that in giving a horse a hypodermic injection—which satisfactorily served its specific purpose—he used a needle, out of the case, which was supposed to be sterilised,

* Received for publication, November 14th.

and it was washed with hot water. A day or two afterwards, the owner informed him that the horse was very bad and could not get its breath. He gave the animal further treatment, but it died. At the *post-mortem* examination, it was found that there was cellulitis of the whole neck, from the site of the injection right up—a horrible mess. Could anyone tell him how to prevent that? He put it down to foulness in the water.

Mr. Dennett quoted the case of a dog, which died suddenly the previous day. On making a *post-mortem* examination, he found the neoplasm, which he produced, in its abdomen. It was suggested that it was either a kidney or a testicle, but the dog had its proper complement of both.

During the further discussion on interesting cases, Mr. P. Welch, of Saffron Walden, suggested that many sheep died of cellulitis, especially if they were on mangel wurzel.

Captain Turner asked if the members had any experience of herbal poisoning from two herbs—dog's wood and buck thorn. About a month previously, he was called rather late to see a cow in the country, standing in a most dejected posture, with chronic twitchings and profuse diarrhœa. The case looked hopeless, but he gave her a drench. In his opinion, that cow had some form of poisoning. Next morning, he examined the pasture on the place, and in a pond, he found a shrub of dog's wood, eaten right down to the woody base. On further investigation, they found four or five more shrubs eaten right down. Curiously enough, the cow recovered. He rang up Professor Wright, of Cambridge, and sent him a specimen of dog's wood. They had for a long time been suspicious of this shrub as being the cause of poisoning in cattle and horses, but they had no definite evidence against it. Professor Wright came over and visited the place, and was of the same opinion as the speaker, that although there were other poisonous plants there, there was not sufficient evidence to incriminate them. In the midst of one of these big shrubs of dog's wood, there was another plant which looked the same. It was buck thorn, and it looked as though this were probably the cause of the trouble. On closer examination, however, they found that there was very little of this plant about. At Cambridge, they were now making distillations from dog's wood, and were going to conduct experiments into its alleged toxicity.

Mr. Nesling intimated that he had had cases of illness which he thought were due to dog's mercury.

Captain Turner replied that dog's mercury was an annual, and only grew a foot or so high. He was referring to a shrub. Until Professor Wright informed him what it was, he had no idea that dog's wood had any poisonous features. In that neighbourhood they saw it on nearly every hedgerow. The stem was nearly blood red, the leaves ovate, ribbed and exactly opposite. It had a small white flower and its fruit was a tiny black berry. The stem of buck thorn was not so red.

The meeting closed with a hearty vote of thanks to the President for his conduct in the chair. Mr. Matthews afterwards kindly entertained the members to tea.

H. P. Standley, junr., *Hon. Secretary.*

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DUMFRIES AND GALLOWAY DIVISION

SUMMER (SOCIAL) MEETING*

A meeting of the above Division was held at the Royal Oak Hotel, Keswick, on Thursday, July 7th, 1932. The President, Mr. W. T. Hewetson, occupied the chair and the following members were present: Messrs. Cameron, Craig Robinson, McAlister, Ritchie, Simpson, Stinson, Young and Davidson (Hon. Secretary). Mr. J. Reid was present as a visitor, and there was also a good attendance of ladies, this being the social meeting.

The minutes of the previous meeting were read by the Secretary and approved.

Apologies for absence were received from Messrs. McKinley, Wilson, Kennedy, Ferguson and Edgar.

Nomination of New Members.—Messrs. J. W. Hewson and J. Reid were nominated for membership of the Division by Mr. Davidson, seconded by Mr. Young. Miss N. Burnett was nominated by Mr. Hewetson, seconded by Mr. Davidson.

Correspondence. — Letters concerning the free treatment of the sick animals of poor persons were read by the Secretary and it was decided to form two sub-committees to deal with the matter on each side of the Border. The committees are: England—Mr. Hewetson (President), Messrs. Craig Robinson and Stinson; Scotland—Mr. Young (Vice-President), Messrs. Milligan and McAlister; the Secretary to attend the committee meetings.

Next Meeting.—Arrangements were made for the Annual General Meeting at Dumfries towards the end of November or beginning of December, on a Tuesday. Alternative subjects were suggested and the Secretary was instructed to make suitable arrangements.

After lunch at the hotel the party proceeded by motor-coach *via* Lake Thirlmere to Grasmere, where the members and their friends were entertained to tea by the President, at the Prince of Wales Hotel. The weather was all that could be desired and a very enjoyable afternoon and evening were spent. A visit was also made to the Storms Dairy Farm, Keswick, and was much appreciated by the members.

Francis A. Davidson, *Hon. Secretary.*

* Received for publication November 22nd.

PURE MILK SUPPLY

People's League of Health Deputation to Ministry of Health

A deputation from the People's League of Health visited the Ministry of Health on November 24th to lay before the Government recommendations for the eradication of tuberculosis in cattle, with particular regard to ensuring the safety of the milk supply. The recommendations are contained in the report of a special committee of the league which was appointed in February, 1930, to make a survey of tuberculosis of bovine origin in Great Britain. The Royal College of Physicians, the Royal College of Surgeons, and the British Medical Association were represented on the committee, on which several members of the veterinary profession served.

The deputation were received by the Minister of Health and, in the absence of the Minister of Agriculture, by the Parliamentary Secretary to the Ministry of Agriculture (Lord De La Warr) and the Parliamentary Under-Secretary for Scotland (Mr. Skelton). The members of the deputation were introduced by Sir Thomas Horder, and included:—

Lord Moynihan, Dr. W. G. Savage, Medical Officer of Health for the County of Somerset (who presided over the committee of inquiry), Lieut.-Colonel Sir Archibald Weigall (Royal Agricultural Society of England), Professor F. T. G. Hobday (Principal of the Royal Veterinary College), and Dr. Norman C. Wright (Director of the Hannah Dairy Research Institute, Ayr).

The deputation submitted the following resolution passed at a meeting called by the People's League of Health:—

"That this meeting, representative of all interests involved, held at the Mansion House, London, on July 11th, 1932, do approve of the report of the People's League of Health on Tuberculosis of Bovine Origin in Great Britain, and urge upon his Majesty's Government the imperative need of giving early practical effect to the proposals it contains."

Sir Thomas Horder said that the report prepared by the League and now submitted contained recommendations designed to ensure the safety of the milk supply. The League hoped that if their recommendations were adopted and the public could be assured of the safety of milk, there would be an increase in the consumption of milk in this country which would be in the interests of the consumer and the producer alike.

Lord Moynihan said that it was the considered opinion of the medical profession that steps ought to be taken to ensure a pure milk supply, or such treatment of milk as would render it safe for consumption. Impure milk was responsible for the spread of many diseases, and, in particular, surgical tuberculosis. The ideal method of preventing milk-borne disease would be to ensure the purity of raw milk, but, failing this, pasteurisation should be adopted. Objections had been brought against pasteurisation, but he did not believe that they had weight. Any diminution in the nutritive value of milk due to pasteurisation could easily be remedied by the supply of other articles of diet. It was, however, essential that the process of pasteurisation should be carefully controlled.

Dr. Savage said that at present no urban area had power to protect its milk supply. The deputation desired to urge upon the Government three main lines of action—first, that active steps should be taken to reduce bovine tuberculosis; secondly, that there should be active encouragement of tuberculin tested herds; and thirdly, that milk should be pasteurised. The deputation was not, however, asking for universal pasteurisation at present, but only that municipalities should be enabled to apply to the Minister of Health for power to require that all milk sold in their districts should be derived from tuberculin tested herds or be pasteurised.

Sir Archibald Weigall, speaking on behalf of the Royal Agricultural Society, endorsed what had been said. The ultimate ideal should be tubercle-free national livestock, but the report was agreed upon as the best half-way house. The ideal was to be attained as laid down in the final report of the Committee on Production and Distribution of Milk, 1919. The difficulties of administration and finance were recognised, but it was felt that uniformity in the application and interpretation of the tests proposed for dealing with this matter was essential.

Professor Hobday explained some of the detailed recommendations contained in the League's Report, and Dr. Wright said that experience in Scotland fully confirmed the need of action on the lines recommended in the Report.

Minister's Reply

The Minister of Health said that he fully appreciated the importance of the milk supply and of the questions raised by the deputation, and he was very conscious of the wide knowledge and experience which the members of the deputation possessed. The report which the League had submitted was one of great value. He was in full sympathy with the desire of the deputation to increase the consumption of milk and he agreed that it was essential to give the public confidence in the safety of the milk supply. The deputation would not expect him to express at present any definite opinion upon the recommendations contained in their report, though the recommendations were generally in consonance with the policy of the Ministry of Health. He had been much interested to hear the expert views of the deputation on the ques-

tion of pasteurisation, and he proposed to ask the Cattle Diseases Committee of the Economic Advisory Council to consider the subject and advise upon it. It would be necessary also, before coming to any definite conclusions, to await the report of the Milk Reorganisation Commission.

Lord De La Warr said that, while the financial aspects of the questions raised by the deputation could not be ignored, the Minister of Agriculture fully appreciated their importance and would welcome any practical steps that would assist the sale of milk or improve the health of stock. The Ministry would be ready to do anything in their power to co-operate with the People's League of Health and other bodies interested in advancing these objects, apart from any measures which the Government itself might find it possible to take.

Dr. Hawthorne, representing the B.M.A., expressed the thanks of the deputation for their reception.

In Parliament

In the House of Commons, last week, the following Bills were presented:—

Exportation of Horses Bill,

"to amend the Law with respect to the exportation of Horses; and for purposes connected therewith," presented by Miss Horsbrugh; supported by Mr. Macpherson, Mr. William Allen, Mr. Edward Campbell, Mr. Holford Knight, Mr. George Hall, Lieut.-Colonel Moore, and Mr. Petherick; to be read a Second time upon Friday, 16th December, and to be printed. [Bill 16.]

Slaughter of Animals Bill,

"to provide for the humane and scientific Slaughter of Animals; and for purposes connected therewith," presented by Colonel Moore; supported by Mr. Buchan, Countess of Iveagh, Mr. Lansbury, Mr. Macpherson, Miss Lloyd George, Sir Hugh O'Neill, Sir Stafford Cripps, Sir Ernest Graham-Little, Sir William Davison, Sir Robert Gower, and Sir Archibald Sinclair; to be read a Second time upon Friday, 9th December, and to be printed. [Bill 22.]

Humane Slaughter of Bovine Animals Bill,

"to provide for the humane and scientific slaughter of bovine animals; and for purposes connected therewith," presented by Mr. Herbert Williams; supported by Mr. Emmott, Mr. Mabane, and Mr. Price; to be read a Second time upon Monday, 5th December, and to be printed. [Bill 24.]

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The following were amongst the questions and answers recorded this week in the Commons:—

Foot-and-Mouth Disease

Mr. Perkins asked the Minister of Agriculture whether his Department are still investigating foot-and-mouth disease; whether any results have been achieved during the past two years; and whether the policy of inoculation has been a success?

The Minister of Agriculture and Fisheries (Major Elliot): Yes, Sir, the Foot-and-Mouth Disease Research Committee appointed in 1924 is still actively at work. During the last two years the committee has investigated, amongst other matters, questions of immunity, the susceptibility of small rodents, the identification of "carriers," the comparative value of virus of various strains and of the different methods of sterilising animal products. This work has contributed materially to our knowledge of the disease. It is not yet possible to come to any definite conclusion concerning preventive treatment by inoculation, which is still in the experimental stage.

. . . . .

Tuberculosis in Cattle (Spahlinger Treatment)

Captain Cazalet (for Mr. Groves) asked the Minister of Agriculture whether he has received any information as to experiments conducted by the Government of Northern Ireland in connection with Spahlinger's vaccine for tuberculosis in cattle; and, if so, whether he can give any information regarding these experiments?

Major Elliott: I have communicated with the Minister of Agriculture for Northern Ireland and am informed by him that satisfactory progress is being made and that an interim Report will be issued by his Department in a few days.

Captain Cazalet: Can the right hon. Gentleman say whether the results do not show that, in the case of vaccinated cattle, the experiment has been 100 per cent. successful?

Major Elliot: It would be well to await the report, which is just about to be published.

Captain Cazalet: Will the right hon. Gentleman make the report available to the House?

Major Elliot: I will consider that suggestion.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

Dec. 5th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

Dec. 5th-6th.—D.V.S.M. Written Examination.

Dec. 6th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries.

Dec. 7th.—D.V.S.M. Oral Examination.

Dec. 7th.—Meeting of the Scottish Society of Veterinary Inspectors, at Glasgow.

Dec. 8th.—R.C.V.S. Written Examination in London, Liverpool, Edinburgh, Glasgow and Dublin.

Dec. 10th.—R.C.V.S. Oral Examinations begin in Dublin.

Dec. 10th.—Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne.

Dec. 22nd.—R.C.V.S. Oral Examinations conclude in London.

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R.C.V.S. OBITUARY

Wadsworth, Charles, 25, Marlborough Street, Oldham, Lancs. Graduated Liverpool, December 15th, 1917; died November 21st, 1932; aged 49 years.

PERSONAL

Birth.—Mackintosh.—On November 28th, at St. Mary's Hospital, Manchester, to Doris A. Mackintosh, M.B., Ch.B., D.P.H., wife of James Mackintosh, M.C., M.R.C.V.S., a daughter.

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Appointment.—At a meeting of the Senate of Queen's University, Belfast, held on November 23rd, on the recommendation of the Academic Council, Mr. A. M'Lean, M.R.C.V.S., D.V.H., was appointed honorary lecturer in comparative pathology.

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Conway Corporation has decided to reorganise its Highways, Sanitary and General Purposes Committee and has formed a distinct Health Committee, with Councillor Wynn Lloyd, J.P., F.R.C.V.S., as its first Chairman.

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H.R.H. the Princess Royal has graciously accepted two copies of "The Pony Handbook for Children" on behalf of Viscount Lascelles and Master Gerald Lascelles.

This little handbook, which is issued free by the Blue Cross Branch of Our Dumb Friends' League, has been compiled in simple language by two late officers of the R.F.A. and the R.A.V.C. (Major Hume Pollock and Major F. Hobday) for the instruction of the members of the pony clubs and young riders generally.

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ARMY VETERINARY SERVICE

India Veterinary Change

On November 27th Brigadier Augustus J. Williams, D.S.O., completed his tenure at Delhi as Director of Veterinary Services after 35 years in the Army, which has included duty in Southern Kordofan, Khartoum, Egypt, Tibet, South Africa, Mesopotamia, India, and Nyima. He has officiated as Principal Veterinary Officer in Egypt and the Sudan, and Deputy Director at G.H.Q., and as D.D. in Northern India, Assistant-Director at G.H.G. in Mesopotamia and the War Office, and Commandant of the Royal Army Veterinary School at Aldershot. As previously announced in the *Record*, Brigadier Williams is succeeded by Colonel Henry S. Mosley, D.S.O., who has been Commandant of the Veterinary and Farriery Schools and Deputy Director at Aldershot.

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PREVENTIVE MEDICINE: "AN ASPECT OF ALL OTHER SUBJECTS"

Addressing the General Medical Council on Thursday of last week, Sir George Newman, Chief Medical Officer of the Ministry of Health, said that preventive medicine should not be described as a subject, but rather as an aspect of all other subjects. It was evident that there was still a somewhat profound misunderstanding as to what preventive medicine really was. Of no subject could it be said that it had not a valuable preventive aspect if it were rightly presented; and unless the Council were careful it was in danger of missing the tide in regard to this aspect of medicine.

Clinical teaching was not taking reasonably full advantage of the advances which had been made in physiology and pathology; he was prepared almost to include anatomy also. Clinical teaching was too many years behind the applications of physiology and pathology to that teaching. The wards and out-patient departments of hospitals had not adequately taken advantage of the enormous advances to which he was referring. He recognised that there were many difficulties in the way of the busy consultant being able, with his many preoccupations, to make use of the knowledge now available. He believed that the clinical teacher, as a rule, treated anatomy too much as a dead subject. He feared that medicine was being split up into too many specialisms. In the last 300 years English medicine had always stood for the unity of medicine, and, in our time, we must be careful to see that we were not entangled and misled into anything which conveyed to the student's mind that many of these things are entities *ad hoc* apart from the general body of medicine.

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WREN'S MEDICAL CONTACTS

The recent celebrations of Christopher Wren's tercentenary remind a contributor to *Clinical Excerpts* (7, 11) that Wren was not only an artist in stone, but a craftsman in science, and that he made several important contributions to medicine.

"The intravenous method of medication which would savour of being the most modern seems, from certain contemporary evidence, first to have been experimented with by Sir Christopher Wren when he was Savilian professor of astronomy at Oxford. 'He was the first author of the noble anatomical experiment of injecting liquors into the veins of animals, an experiment now vulgarly known; but long since exhibited to the meetings at Oxford; and thence carried by some Germans and published abroad,' wrote Bishop Sprat in 1667. The proceeding had first taken place 11 years previously in 1656, and Boyle and Wilkins had assisted at the experiment. 'Pretty big and lean dogs' were used in order to get large prominent veins, and the apparatus was composed of quills to which a small bladder was attached 'like a clyster.' The drugs used were opium and crocus metallorum. According to Boyle, the first stupefied the dog but did not kill him, the second caused him 'to vomit up life and all.'

"In 1664 was published Thomas Willis' *Cerebri Anatome*, to which was added a description of the nerves. The illustrations to this work were engravings by Wren. Although some of Willis' reasoning may have become out of date due to his faulty technique, Wren's drawings are as up to date as any that illustrate modern manuals, and are a good deal more beautiful. One is struck by the clear definition of the engravings and the remarkable accuracy of the draughtsmanship. The picture illustrating the exit of the nerves through the foramina of the base of the skull would do credit to any scientific treatise of to-day.

"Among the objects to which he recommended the Royal Society, of which he was a president, to devote its attention were an account of epidemic diseases, the effect of weather upon medicine, and annual bills of mortality in London; that 'instead of the vanity of prognosticating he could wish we would have the patience for some years of registering past times, which is the certain way of learning to prognosticate.' He constructed a self-registering weathercock and a self-registering thermometer, besides numerous other ingenious mechanical contrivances. He devised a theory of refraction and in this way helped towards the manufacture of good eyeglasses in other forms than spherical."

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The official figures of the livestock census on June 1st in all Ireland, just published, show an increase of 29,939 cattle, but decreases in sheep and pigs of 116,418 and 134,593, respectively.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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UTERINE ATRESIA IN THE HEIFER

To the Editor of the Veterinary Record.

Sir,—In the Clinical and Case Report section of the *Record* of October 29th, there is a very interesting communication, under the above heading, from Mr. S. Jamieson.

Mr. Jamieson is under the impression that this condition is of considerable rarity. This may be the case in some districts, but in others it appears to be relatively common. In my experience, and that of several experienced cattle practitioners with whom I have, at various times, discussed the subject, it is generally found in white animals, especially in Shorthorns and Shorthorn crosses. I myself have met with it in white, red-roan, and blue-roan animals, and once in a black-and-white (Shorthorn-Friesian cross), but never in a whole-coloured animal other than a white, or in a pure-bred beast other than a Shorthorn. This may be only a series of coincidences, and it would be interesting to hear the views of other members of the profession on the point. I have been told by extensive dealers in "North-Country cattle" that this condition is especially common in "Cumberland Cattle," but have had no personal experience as to the accuracy of this assertion. No animal seen by me, suffering from this complaint, originated in that county. All those I have met with in England have been locally-bred stock or imported Irish animals.

In England I have met with "white heifer disease" in Norfolk, Suffolk, Lancashire and Derbyshire; and in Ireland, in the Counties of Monaghan, Tyrone, and Fermanagh. It is frequently seen in certain districts of Co. Monaghan, and is well known to farmers there, under the title of "white heifer disease." In those Irish counties I have mentioned, white cattle are looked on with great dislike by stock breeders.

Mr. T. D. S. Taylor, M.R.C.V.S., of Glaslough, Co. Monaghan, designed an instrument for dealing with this condition, which, so I have been informed by those with experience in its use, is very effective.

The usual history in cases seen by me has been as follows:—The heifer appeared quite normal in every way and was "a good doer" until service took place.

Shortly after service she was seen to be straining; and, in some cases, mucus and blood were passed, and colicky symptoms shown. In cases where the owner had never seen the condition, he generally considered that the animal had been "hurt by the bull," and so summoned professional aid.

On examination *per rectum*, the uterus can be felt as an enormous tense mass, extending sometimes further forward than one can reach. Vaginal examination is difficult in many cases, as this passage is often much smaller in calibre throughout its length than in a normal animal.

Sometimes the septum is relatively thin and easily punctured; but in other cases the vaginal walls appear to be closely adherent for a great part of their length; and, in these latter cases, remedial treatment is likely to be impossible.

Treatment of any sort is usually only palliative, and such animals are fit only for the butcher, being best sent for slaughter at once, if in good condition and not toxæmic.

Mr. Jamieson's treatment is rational, and his drainage tube ingenious, but I should not use perchloride of mercury solution in a bovine, preferring the use of normal saline, followed by lysol or other antiseptic. Some cattle appear remarkably susceptible to poisoning by mercury, even in minute doses, and I have seen casualties from the use of diluted "blue ointment," when dispensed by chemists as a dressing for ringworm. Moreover, saline solutions liquefy the mucoid material and assist in syphoning it off, whereas perchloride is apt to coagulate it. In cases where the septum is thin enough to permit of a sufficiently large opening being made, the insertion of antiseptic gelatine pessaries is advisable, as their action is more lasting than that of a douche.

Yours faithfully,
J. C. Taylor.

40, Station Road,
Beccles, Suffolk.
November 22nd, 1932.

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PROLAPSE OF THE UTERUS

To the Editor of the Veterinary Record.

Sir,—I do not think that Mr. Forbes is strictly correct in stating that prolapse of the uterus in the cow is due to rupture of the broad ligaments. Surely the predisposing factors in this animal are the anatomical disposition of the ligaments in the first place, and a relaxation (*i.e.*, atony) in the second. The tendency to torsion of the uterus in this animal has, I believe, been ascribed to the anatomical disposition of the broad ligaments.

Why should not a calcium deficiency be responsible for this atony in these cases? In those cases where milk fever is occasionally met with a few days after œstrum, it is often found that the cows do not hold to the next service, and as I think most veterinary surgeons—whether they agree with calcium therapy or not—admit that milk fever is associated with a calcium deficiency, it is feasible to assume that this is the cause in these cases.

Coming to other diseases associated with the genital tract of the cow, mineral deficiency is responsible for the so-called "hunger sterility" which is frequently encountered on the smaller farms in those parts of West Prussia bordering on Poland. Owing to the poor soil, the quality of the fodder leaves much to be desired, and there are too many cattle to the acre. They look miserable, and are small, lean, and light. Moreover, it is difficult to examine the vagina on account of the narrowness of the pelvic cavity. Vaginal and rectal exploration fail to show any signs of disease, and in the inner sexual organs there is no indication of a normal œstrous cycle and no corpus luteum can be found. For months, often for a year and longer, there is no œstrous.

In the case of the so called "Wendener disease" (so named after the place where it was first noticed), which resembles malignant catarrhal fever—only no fever is present—and which is characterised by skin eruptions, the affected cows either aborted or gave birth to weakly calves. Improving the soil and liming has had excellent results.

Turning now to the vexed question of the relationship of abortion with sterility, on which no two minds are often in unison and upon which it would appear that opinions are at times remarkably contradictory and fantastic, it should be remembered that in some cases there is no relationship, and that in the most valuable herds

a connection exists between sterility and the conditions of rearing and feeding. I may comment on this subject later.

In cases of nymphomania, fractures are not uncommon, owing to the constant functioning of the ovaries resulting in a loss of calcium, and it is often possible in these cases to make a positive diagnosis of the disease long before the appearance of cysts, owing to the marked atony of the sacro-tuberous supports.

I therefore regard the hypothesis advanced by Mr. Heatley on the etiology of prolapse of the uterus, as one that has a scientific basis, and I think that it would be interesting to ascertain, in such cases, if a calcium deficiency exists.

Yours faithfully,
J. F. D. Tutt.

1, St. Cross Road,
Winchester.
November 26th, 1932.

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PASTEURISATION AND TUBERCULOUS MILK

To the Editor of the Veterinary Record.

Sir,—Referring to Mr. Rabagliati's interesting article in your issue of to-day, he writes: "As it is said that efficient pasteurisation is capable of destroying tubercle bacilli and rendering infected milk safe for consumption it must be concluded . . ." Is this true? Is the temperature to which pasteurised milk is raised sufficient to destroy one single tubercle bacillus of tuberculous milk, *naturally, as opposed to artificially, infected*? I discussed this question some years ago with a well-known pathologist. He said: "The bacilli would kick their heels at it," and he went further and said he had in biological tests proved the infectivity of milk that had been kept at the boiling point for five minutes and upwards. He stressed the point that his experiments were from tuberculous milk as given by an infected cow and "not milk mixed with bacilli grown in a test tube."

Yours faithfully,
John B. Tutt.

Rothiemurchus,
St. Cross, Winchester.
November 26th, 1932.

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VAGINAL TREATMENT OF STERILITY WITH PARATBLATTCHEN

To the Editor of the Veterinary Record.

Sir,—I am glad to know, from the enquiries that I have received, that the translation of Dr. Becker's articles on the use of paratblättchen has interested such a large number of members of the Profession. I hope that they will not fail to record their results in due course.

I should like to mention that this line of treatment has cleared up an outbreak of vaginitis in a herd of mixed Shorthorn and Guernsey heifers which had resisted other methods of treatment for some long time. In most instances two applications sufficed.

In this connection, I desire to emphasise that in some cases where the vaginitis is severe, or if the animal is very sensitive, uneasiness often follows, and in some instances severe straining. This is not important (as Dr. Becker states in his article) but it is apt to worry the client, who in turn worries you! I therefore suggest that, when this occurs, in future applications the green parenchymatol leaf should be on the outside and the white zinc leaf within, as Dr. Becker suggests in the case of the mare.

Yours faithfully,
Winchester. J. F. D. Tutt.

CONTAGIOUS IRIDO-CYCLITIS IN SHEEP

To the Editor of the Veterinary Record.

Sir,—I was interested in the above article by F. T. Harvey, F.R.C.V.S., in last week's *Record*. Dr. T. Oppermann, of the Veterinary School at Hanover, refers to a similar malady in his book "Lehrbrich der Krankheiten des Schafes." He remarks that Fünfstück, of Saxony, reported some cases in 1869: of 300 sheep about 50 were affected with a double-sided keratitis (so called), the cornea was clouded milk white, and enclosed with a broad red band. The animals were kept housed for several days because they could not see. They were treated with collyria of sulphate of zinc and belladonna.

Pfeifer, in 1856-1857, noticed an infectious keratitis in 275 sheep which he treated successfully with lead and opium eye lotion. Répiquet in *Jour. de Méd. Vét.*, 1882, also reported some cases.

Results were favourable, but no original causes are given.

Yours faithfully,
G. Mayall.

24, Pool Street,
Bolton.

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SPINAL ANÆSTHESIA

To the Editor of the Veterinary Record.

Sir,—The extract entitled "Effects of Spinal Anæsthetics on the Spinal Cord and the Membranes," appearing on p. 1425 of last week's *Record*, is liable to give a wrong impression and calls for comment.

Firstly, both in cattle and dogs, extradural injections are employed, in cattle through the sacro-coccygeal or intercoccygeal (1 and 2) space, and in dogs through the lumbo-sacral space. The anæsthetic fluid acts on the spinal nerves immediately on their emergence from the dura mater within the spinal canal. Injury to the cord, therefore, cannot occur. Even if the injection were subdural there need now be no risk of injury, as Hewer, in his "Recent Advances in Anæsthesia and Analgesia" (1932), p. 114, states that the introduction of percaine has altered the whole situation of the harmfulness of spinal anæsthetics. It is not injurious like cocaine, novocaine, etc., the relevant factor being that percaine alone is effective in a very dilute solution, having its S.G. lower than that of the cerebrospinal fluid.

With regard to canine practice, the contra-indication of general anæsthesia provides the chief indication for spinal block for the performance of a laparotomy, and for cattle there is no longer any need for one to put up with that bugbear of the obstetrician—straining.

Yours faithfully,
J. Tweedale Edwards.

Imperial Bureau of Animal Health,
Weybridge.

The Editor acknowledges, with thanks, the receipt of the following:—

Reports of meetings of the Lancashire and the West of Scotland Divisions, N.V.M.A., from their respective Hon. Secretaries—Messrs. A. L. Mullen and Alex. Thomson.

Communication from Mr. J. C. Taylor (Beccles).

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Erratum.—For *Health* read *Genetics* in the reference made in the title of the first abstract of last week's issue to the publication in which Mr. F. Fraser Darling's article appeared.